PROJECT FACT SHEET

CONTRACT TITLE: Improvement of Oil Recovery in Fluvial-Dominated Deltaic Reservoirs in Kansas -- Class I

ID NUMBER: DE-FC22-93BC14957

B&R CODE: AC1010000

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PROJECT SITE
CITY: Savonburg Field (Allen Co.) **STATE:** KS
CITY: Stewart Field (Finney Co.) **STATE:** KS
CITY: **STATE:**

CONTRACT PERFORMANCE PERIOD:
6/18/1993 to 9/30/1999

PROGRAM: Field Demonstration
RESEARCH AREA: Class 1
PRODUCT LINE: RLE

FUNDING (1000'S)	DOE	CONTRACTOR	TOTAL
PRIOR FISCAL YRS	2007	3858	5865
FISCAL YR 1999	0	0	0
FUTURE FUNDS	0	0	0
TOTAL EST'D FUNDS	2007	3858	5865

OBJECTIVE: The University of Kansas has combined with two oil operators to demonstrate the applications of current technologies for increasing oil recovery in Kansas. The demonstration sites are the Savonburg Field (Cherokee sandstone) and Stewart Field (Morrow sandstone). The demonstration technologies include: (1) reservoir management, (2) polymer flooding, (3) in-situ permeability modification, and (4) infill drilling for bypassed mobile oil.

Dec 1999

PROJECT DESCRIPTION:

Background: The University of Kansas geological and engineering groups, along with a group of operators, have demonstrated the applications of current technologies for increasing the recovery efficiency and economics in Cherokee and Morrow sandstone fluvial-dominated deltaic reservoirs in Kansas. Two field demonstration sites were selected - the Savonburg and Stewart fields. The projects include a broad range of technologies: (1) reservoir management, (2) polymer flooding, (3) in-situ permeability modification, and (4) infill drilling for bypassed mobile oil. The production problems include: (1) poor volumetric sweep due to reservoir heterogeneity, (2) clogging of injection wells with solids during waterflooding, and (3) poor waterflood sweep efficiency (4) lack of optimization of production

Work to be Performed: The work will demonstrate applications of current technology for increasing recovery efficiency and economics using the following technologies: (1) reservoir management, (2) reservoir characterization, (3) polymer flooding, (4) in-situ permeability modification, and (5) infill drilling. A major emphasis will be placed on doing the projects in a cooperative manner that involves University of Kansas scientists and engineers and oil operators. The groups will work together to implement the technologies and to transfer the technologies to other operators.

PROJECT STATUS:

Current Work: Project completed. Final report in progress.

Scheduled Milestones:

Complete final report 03/99

Accomplishments: Engineering and geologic studies were carried out on the Savonburg Field. The studies identified areas of high potential for unrecovered mobile oil. An in-fill well was drilled and cored, which confirmed the results from these studies. Based on this work, well workover plans and waterflood pattern changes are being developed which target high potential areas. Waterflood water quality was studied and a water clean-up system incorporating air flotation was designed and installed in the field. Injection water quality has been improved significantly with a 90% decrease in solids content. The incremental production from Savonburg Field is estimated at 363,000 barrels of oil. Air flotation was successfully implemented as a method to improve water quality. Different techniques concerning wellbore cleanup were developed, and the technologies were transferred to local service companies for widespread use in the shallow slim-hole completed wells of eastern Kansas. Engineering and geologic studies including the computer simulation of the Stewart Field have been accomplished. Primary production was history matched with the computer model. Simulation and study of polymer-augmented waterflooding indicated that this process would not be economical on the Stewart Field. Several alternative waterflood designs were examined with the simulator. Based on the simulations, waterflooding appears to be technically and economically attractive. Laboratory studies have indicated that the reservoir has some sensitivity to water. Based on these studies, a waterflood was designed and implemented in the Stewart Field. A reservoir management strategy has been developed which incorporates continued multidisciplinary analysis of waterflood data and updating the computer model in an attempt to optimize secondary recovery. The Stewart Field has responded favorably to water injection with oil production increasing from less than 300 BOPD to over 3150 BOPD. Incremental production from Stewart Field from March 1996 to July 1999 is 1.64 million barrels of oil and the ultimate recovery is estimated to be 4 million barrels. The Stewart Field project was awarded, "Best Advanced Recovery Project in the Mid-Continent" by Hart's Oil & Gas World for 1995. Lowered operating costs for production water treatment. Improved quality of injected and produced water. Optimized waterflood oil recovery through improved reservoir management techniques in the Stewart Field. General methodologies were developed and disseminated for the evaluation and exploitation of mature oil reservoirs.